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THE FORESTS OF ALLEGANY COUNTY

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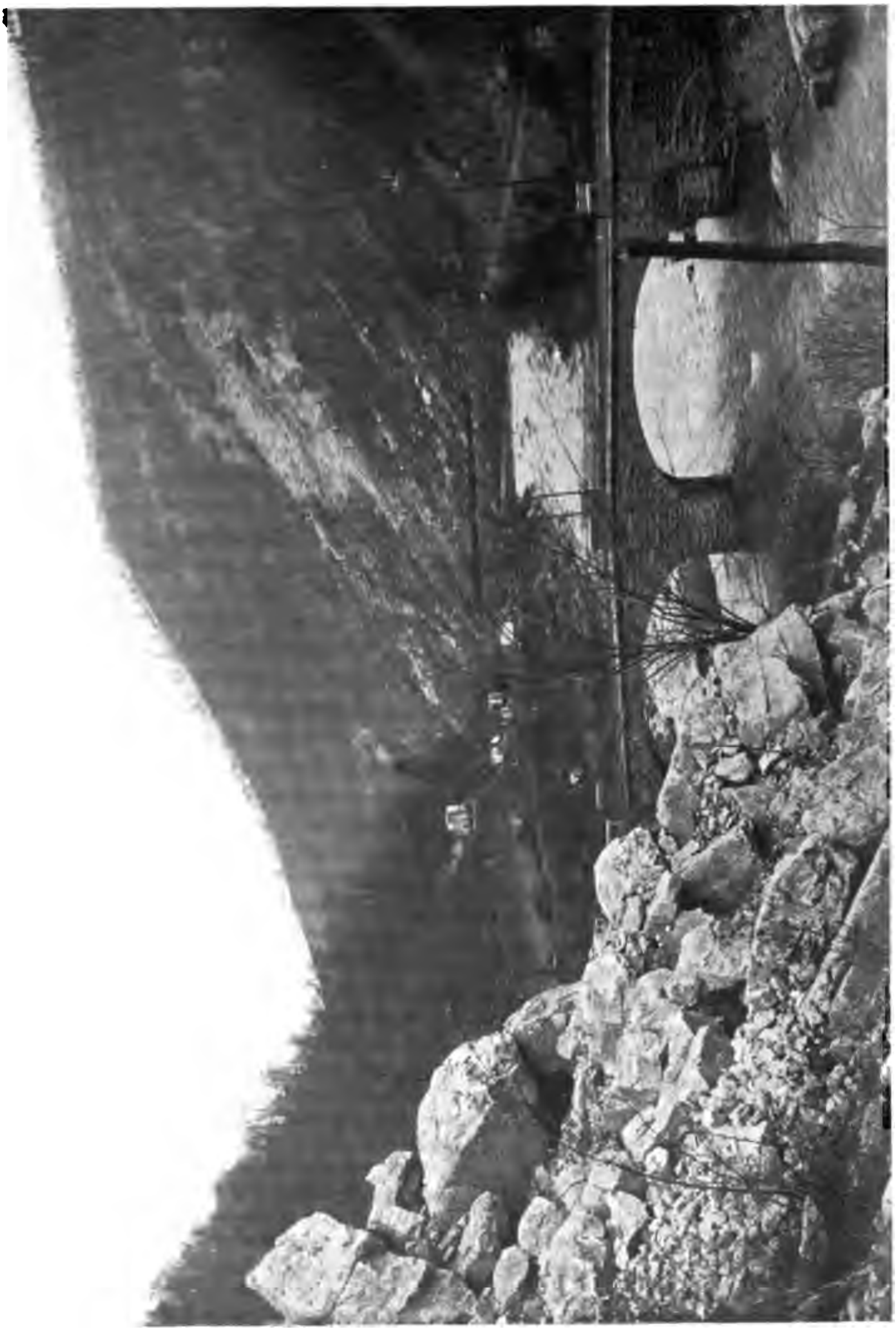

THE NARROWS NEAR CUMBERLAND, SHOWING A THIN FOREST COVER DUE TO REPEATED FOREST FIRES

MARYLAND STATE BOARD OF FORESTRY

WM. BULLOCK CLARK
Executive Officer

F. W. BESLEY
State Forester

THE FORESTS OF ALLEGANY COUNTY

BY

F. W. BESLEY

BALTIMORE, MD.
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THE FORESTS OF ALLEGANY COUNTY

INTRODUCTION.

The forests of Allegany County are one of her chief assets. Much the greater part of the area consists of rough mountain land upon which the growing of timber must continue to be the chief crop, and it is, therefore, of the greatest importance to the county to make these lands as productive as possible. This is further emphasized by the need of a good local supply of timber to carry on the present industries, and to aid in their further development. The extensive coal mines in the western part of the county require immense quantities of mine props, pit ties and mine rails; the railroads draw upon the forests for large quantities of cross ties; the telephone and telegraph companies require thousands of poles annually; the saw mills and wood-using industries, with large amounts of capital invested and giving employment to hundreds of men, cannot be maintained without a cheap and abundant supply of timber. Not only is better forest management necessary for maintaining the supply of timber to foster the industries of the county, but the value of a well-regulated forest cover in the mountain watersheds for the control of stream flow is of almost equal value.

A forest survey of Allegany County was made by the writer in 1908 to determine the extent, character and condition of the woodlands, with a view to suggesting methods of improvement. The main results of this survey are embodied in the following report, accompanied by a forest map which is attached to the back of the report.

TOPOGRAPHY AND SOILS.

The topography of the county is characterized by a succession of prominent ridges, from 1,000 to 2,500 feet in altitude, extending in a northeasterly and southwesterly direction from the Pennsylvania line to the Potomac River on the southern border. Between these unbroken ridges are narrow valleys cut by numerous streams, flowing into the Potomac River, which receives the drainage from the entire county. The valleys between the ridges form the natural outlets for the traffic of that country.

The soils are variable in character, giving rise to a number of forest types. The shales predominate in the eastern three-fourths of the county, forming, for the most part, the shallow soils of the steeper slopes upon which most of the forests occur. Limestone appears on some of the higher mountain ridges, resulting in a characteristic flat-topped formation and a very productive soil which, in most cases, has been cleared for agriculture. The shale lands, varying in color from yellow to red, and from blue to black, are usually shallow, easily heated, and apt to suffer severely from drought in dry seasons—hence less favorable for farm crops. The soils along Dan's Mountain and to the westward are of a sandy loam character, capable of a better tree growth than the shales of the eastern section. The rough topography gives good, natural drainage which is one of the requisites of a satisfactory tree growth. The forests on the thin dry soils of the ridges are totally different in character from those found on the deeper, moist soils of the lower slopes.

CHARACTER OF THE FORESTS.

Sixty-two per cent of the area of the county is wooded. Of this wooded area not more than one per cent is virgin forest, the other ninety-nine per cent being cut over once, if not several times, since the settlement of the county about one hundred and fifty years ago. At that time heavy virgin forests covered probably ninety-five per cent or more of the county. Clearing for farm land has reduced the wooded area to less than two-thirds of the total area. Furthermore, the present wooded area has been repeatedly cut over and burned until the character of the forest has been greatly changed. The quest for valuable kinds of wood has led to a systematic culling of the forests in all parts of the county, until most of the merchantable material has been cut. Lumbering operations have nearly always been followed by severe forest fires in the tops and laps of the trees left on the ground, causing, in many cases, a complete destruction of all standing growth. Not only has the young growth been destroyed, but the humus of the soil has also been destroyed, depriving it of a natural protection and fertility, thus exposing the surface to the drying effect of sun and wind until it has become hard, and largely unproductive. Excessive cutting and fires have almost eliminated, in some places, certain species that were of the most value years ago, notably white pine and yellow poplar. This normal balance, whereby the increased proportion of the valuable species may be re-established, cannot be brought about except by a radical change in the methods of logging now practiced.

TABLE I.—*Allegany County Wooded Area, Stand and Value of Saw Timber by Election Districts.*

District	Total area.	Wooded area.	Per cent wooded.	Stand of Saw Timber. All species 10 inches or over in diameter.				Stumpage Value.			
				Hardwoods.	Pine.	Mixed hardwood and pine.	Total.	Hardwood $2.50 per M.	Pine $3 per M.	Hardwood and Pine $2.50 per M.	Total.
No.	*Acres.*	*Acres.*	*Per Cent*	*M bd. ft.*	*M bd. ft.*	*M bd. ft.*	*M bd. ft.*	$	$	$	$
1	40.877	29,424	72	7,391	2,301	8,422	18,114	18,477	6,903	21,055	46,435
2	36,774	22,008	60	6,633	341	3,551	10.525	14,575	1,023	8,878	24,476
3	44,190	28,407	64	14,208	2,430	10,278	26,916	35.520	7,290	25,695	68,505
4	185	44	24	10	.....	.....	10	25	.....	.....	25
5	5.430	2,346	43	2,276	.....	157	2,433	5,690	.....	393	6,083
6	8.961	5,562	62	2,531	.....	747	3,278	6.327	.....	1,868	8,195
7	18,682	13,395	66	11,251	.....	.....	11.251	23.127	.....	.....	28,127
8	11,994	8,737	73	5,971	.....	.....	5,971	14,952	.....	.....	14,952
9	3,805	1,188	31	1,056	.....	.....	1.056	2,640	.....	.....	2,640
10	2,877	1,071	37	841	.....	.....	841	2,102	.....	.....	2.102
11	1,526	885	58	1,089	.....	.....	1,089	2,722	.....	.....	2,722
12	2.024	355	17	499	.....	.....	499	1.247	.....	.....	1,247
13	16,878	8,439	50	9,743	.....	49	9,792	24,357	.....	123	24.480
15	5.281	3.842	72	3,400	.....	.....	3,400	8,500	.....	.....	8,500
16	18,800	11.340	60	2.637	.....	273	2,910	6.592	.....	683	7,275
17	6,589	4,752	72	4.676	.....	.....	4.676	11,690	.....	.....	11,690
18	4,521	2.217	49	1,870	.....	.....	1.870	4,675	.....	.....	4.675
19	1,812	885	49	858	.....	.....	858	2.145	.....	.....	2,145
20	6.184	4,826	78	4.735	.....	701	5,436	11.837	.....	1,753	13,590
21	12,175	5,622	47	5,984	123	694	6.801	14,960	369	1,735	17,064
22	4,390	1.318	30	1,479	51	36	1,566	3,698	153	90	3,941
23	2,516	1,363	26	584	38	506	1,128	1,460	114	1,265	2,839
24	3.587	1,239	31	1,323	.....	.....	1,323	3,307	.....	.....	3,307
25	1,582	879	55	879	.....	.....	879	2,197	.....	.....	2,197
26	1,575	1.108	70	2,864	.....	.....	2,864	7,160	.....	.....	7.160
27	3,363	2,410	80	1,962	.....	.....	1,962	4,905	.....	.....	4,905
28	336	181	54	163	.....	.....	163	407	.....	.....	407
Total	266.364	163.882	62	96,913	5,284	25,414	127,611	240,294	15,852	63,538	319,684

The forests may be divided into three classes; namely, hardwood, pine, and mixed hardwood and pine. The hardwood forests cover 128,140 acres, or 78% of the wooded area; the pine forests, including a small area of hemlock, cover 3,164 acres, or 2% of the wooded area; while the mixed hardwood and pine forests cover 32,346 acres, or 20% of the wooded area. In the stand of saw timber the hardwood forests contain 99,501,000 board feet, the pine forests 5,294,000 board feet and the mixed forests 22,816,000 board feet.

The forests of Allegany County formerly contained a much larger percentage of pine and hemlock than they do now. Pine, particularly the white pine, is a timber tree that invited early exploitation because of its greater value and ease in logging. With the removal of the pine, other competing hardwoods rapidly took possession of the openings, making it difficult for the pine to re-establish itself. Furthermore, forest fires, so frequent in the county, have killed young seedlings that may have started, and the pines, lacking the power of regeneration by sprouts, have been largely replaced by the more persistent hardwoods that possess the power of growing from the roots and stumps after the stems have been killed by fires.

FOREST TREES.

There are fifty-four distinct species of forest trees growing native in Allegany County, and many of these are of commercial importance.

A complete list is here given.

CONIFERS.

Common Name.	*Botanical Name.*
White Pine	Pinus strobus.
Pitch Pine	Pinus rigida.
Table Mountain Pine	Pinus pungens.
Scrub Pine	Pinus virginiana.
Hemlock	Tsuga canadensis.
Red Cedar	Juniperus virginiana.

BROADLEAVED TREES.

White Oak	Quercus alba.
Chestnut Oak	Quercus prinus.
Post Oak	Quercus minor.
Swamp White Oak	Quercus platinoides.
Scarlet Oak	Quercus coccinia.
Red Oak	Quercus rubra.
Pin Oak	Quercus palustris.
Black Oak	Quercus velutina.
Barren Oak	Quercus pumila.
Shagbark Hickory	Hicoria ovata.
Mockernut Hickory	Hicoria alba.
Pignut Hickory	Hicoria glabra.
Bitternut Hickory	Hicoria minima.
Chestnut	Castanea dentata.
Black Walnut	Juglans nigra.
Butternut	Juglans cinerea.
Beech	Fagus atropunicea.
River Birch	Betula nigra.
Sweet Birch	Betula lenta.
Basswood	Tilia americana.
Yellow Poplar	Liriodendron tulipifera.
Sugar Maple	Acer saccharum.
Red Maple	Acer rubrum.
Silver Maple	Acer saccharinum.
Striped Maple	Acer pennsylvanicum.
Mountain Maple	Acer spicatum.
Cucumber	Magnolia acuminata.
Largetooth Aspen	Populus grandidentata.
Black Locust	Robinia pseudacacia.
White Elm	Ulmus americana.
Slippery Elm	Ulmus pubescens.
Black Gum	Nyssa sylvatica.
Sycamore	Platanus occidentalis.

BROADLEAVED TREES.—*Continued.*

White Ash	Fraxinus americana.
Black Ash	Fraxinus nigra.
Green Ash	Fraxinus lanceolata.
Wild Black Cherry	Prunus serotina.
Wild Red Cherry	Prunus pennsylvanica.
Sassafras	Sassafras sassafras.
Hackberry	Celtis canadensis.
Red Mulberry	Morus rubra.
Persimmon	Diospyros virginiana.
Hornbeam	Ostrya virginiana.
White Willow	Salix alba.
Redbud	Cercis canadensis.
Blue Beech	Carpinus caroliniana.
Shad Bush	Amelanchier canadensis.
Dogwood	Cornus florida.

IMPORTANT COMMERCIAL TREES.

The principal timber trees of the county are white oak, red oak, chestnut, chestnut oak, sugar maple, hickory, basswood and ash.

White oak is used extensively for bridge timbers, car stock and railroad ties, for which it is especially adapted. Most of the white oak timber is found along the lower slopes of the mountains on deep, fresh soil.

Red oak is often associated with white oak in the forest, but in addition it is found on the higher slopes. The larger trees are found in the rich coves and fertile soils of the lower slopes. The wood is used extensively for saw timber, taking the place of white oak for many uses.

Chestnut is found chiefly on the poorer, dry, rocky soils of the southern, western and eastern slopes, often mingling with chestnut oak on the higher elevations. Chestnut is used extensively for telephone and telegraph poles, railroad ties, fence posts, etc.

Chestnut oak is usually found on the upper rocky slopes and the summits of the hills and higher ridges. The trees are cut extensively for railroad ties, mine ties, as well as mine props. Another valuable

TABLE II.—*Culled Hardwood Slope Forest Showing the Number of Trees of Each Species on An Average Acre.*
(C³ Class on Forest Map.)

Diameter in inches.	Chestnut	White Oak.	Hickory.	Chestnut Oak.	Locust.	Red Oak.	Dogwood.	Pin Oak.	Maple.	Black Oak.	Ash.	Sugar Maple.	Basswood.	Horn Bean.	Shadbush.	Cucumber.	Cherry.	Scrub Pine.	Butternut.	Scarlet Oak.	Sassafras.	Hawthorne.	Others.
2	8.93	7.85	12.14	5.47	8.93	4.40	12.85	......	7.49	1.90	5.00	2.86	1.66	2.38	3.80	.48	.60	.36	.95	.36	1.43	.48	.96
3	5.40	12.14	4.40	5.00	3.04	4.04	2.02	.48	3.21	1.66	1.90	1.20	.60	3.09	1.20	.24	.48	1.07	......	......	.48	.36	.48
4	5.24	7.85	4.16	5.44	1.43	2.38	1.78	1.43	.71	1.54	1.20	.95	.48	.83	......	.95	.24	.36	.24	......	.24	.12	....
5	5.24	5.12	3.09	3.45	1.54	2.62	.36	1.90	.60	.71	.24	1.43	.71	......	.24	.71	.48	......	.48	......	....	....	....
6	6.54	4.76	1.54	1.78	2.38	.95	......	2.14	.24	.95	.24	.82	.95	......	......	.24	.71	.36	.48	......	....	....	....
7	3.92	3.80	1.20	1.43	1.66	2.26	......	2.86	......	.82	.24	.24	.95	......	......	.24	.60	......	.24	.36	....	....	.60
8	3.92	1.90	.71	.36	2.50	1.31	......	.95	.36	.36	.24	......	.48	......	......	......	.60	.36	......	......	....	....	....
9	4.76	.82	1.36	1.54	1.90	1.43	......	.95	......	.36	......	.24	.48	.24	......	.24	......	......	......	1.07	....	....	....
10	5.24	.82	......	......	1.43	.71	......	.48	......	......	......	......	......	......	......	.36	......	......	......	......	....	....	....
11	5.24	.24	.36	......	.60	......	......	.48	......	1.78	.24	......	.48	......	......	.24	......	......	......	......	....	....	....
12	1.78	......	......	.36	.36	.24	......	.82	......	.71	......	.71	......	......	......	......	......	......	......	.36	....	....	....
13	1.90	.95	.24	1.07	......	.60	......	.24	......	......	......	.24	......	......	......	.48	......	......	......	......	....	....	....
14	.24	.48	......	......	......	.60	......	......	......	......	......	......	......	......	......	......	......	.36	.24	......	....	....	....
15	1.43	......	.24	......	......	.24	......	......	......	......	......	.24	.24	......	......	......	......	......	......	......	....	....	....
16	.36	.71	......	......	......	......	......	.24	......	......	......	......	......	......	......	.24	......	......	......	......	....	....	....
17	.24	.36	......	......	......	.12	......	......	......	......	......	......	.24	......	......	......	......	......	......	......	....	....	....
18	.71	......	.24	......	......	.36	......	......	......	......	......	.24	......	......	......	......	......	......	......	......	....	....	....
19	.24	.24	......	......	......	.48	......	......	......	......	......	......	......	......	......	......	......	......	......	......	....	....	....
20	.36	.36	......	......	......	.12	......	......	......	......	......	......	......	......	......	......	......	......	......	......	....	....	....
21	......	.36	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	....	....	....
22	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	....	....	....
23	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	....	....	....
24	......	......	......	......	......	.12	......	......	......	......	......	......	......	......	......	......	......	......	......	......	....	....	....
25	......	......	......	.24	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	....	....	....
26	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	....	....	....
27	......	.24	......	.24	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	....	....	....
28	......	.24	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	....	....	....
29	......	.24	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	....	....	....
Totals.....	61.69	49.48	28.68	26.38	25.77	22.98	17.01	12.97	12.61	10.79	9.30	9.17	7.27	6.58	5.24	4.42	3.71	2.87	2.63	2.15	2.15	.96	2.04
Percentg..	19.00	15.00	8.00	8.00	8.00	7.00	5.50	4.00	4.00	3.00	2.5	3.5	2.5	2.00	1.6	1.4	......	1.	1.	.6	.6	.2	.6
10 in. and over in diameter	17.74	5.24	1.08	1.91	2.39	3.59	......	2.22	.....	2.48	.24	1.08	.96	......	......	1.32	.....	.36	.24	.36	....	....	....

product of the chestnut oak is the bark, which is peeled from the larger trees that are usually cut for railroad ties.

Sugar maple, hickory, basswood and ash are of less importance than the other trees mentioned, but form a considerable proportion of the forest stands. These trees are usually found on the lower slopes, particularly the northern exposures. The larger trees of these species are cut into saw timber, while the smaller ones are utilized for mine props.

White pine is not abundant, being confined to a relatively few locations where it occurs in mixture with the hardwoods. It is seldom found except on northern and eastern slopes indicating its strong preference for moist, well-drained, fertile soils. The cut of white pine lumber, amounting to over three million feet in 1909, shows that it is still a tree of considerable importance.

Scrub pine, pitch pine, and table-mountain pine are abundant in certain sections, particularly in the eastern part of the county. These pines usually grow on the dry sterile soils of southern slopes, the scrub pine occupying the low hills and lower slopes, while the pitch and table-mountain pine are more often found on or near the top of the ridges. Nearly four million feet of yellow pine lumber was cut in 1909, made up entirely of the three tree species named above, which indicates the relative commercial importance of these trees.

There are a number of other trees of value, such as black walnut, butternut, black cherry, cucumber, elm, sycamore, locust and red cedar, but as they occur only occasionally in the forest they are not commercially important.

FOREST TYPES.

The greatest changes in the forest are noted in ascending or descending the mountain slopes, so that certain forest types may be distinguished by relative location, as lower slope, upper slope, and ridge. These types will merge one into the other at their altitudinal limits, but in the main, their general characters are sufficiently well established for differentiation.

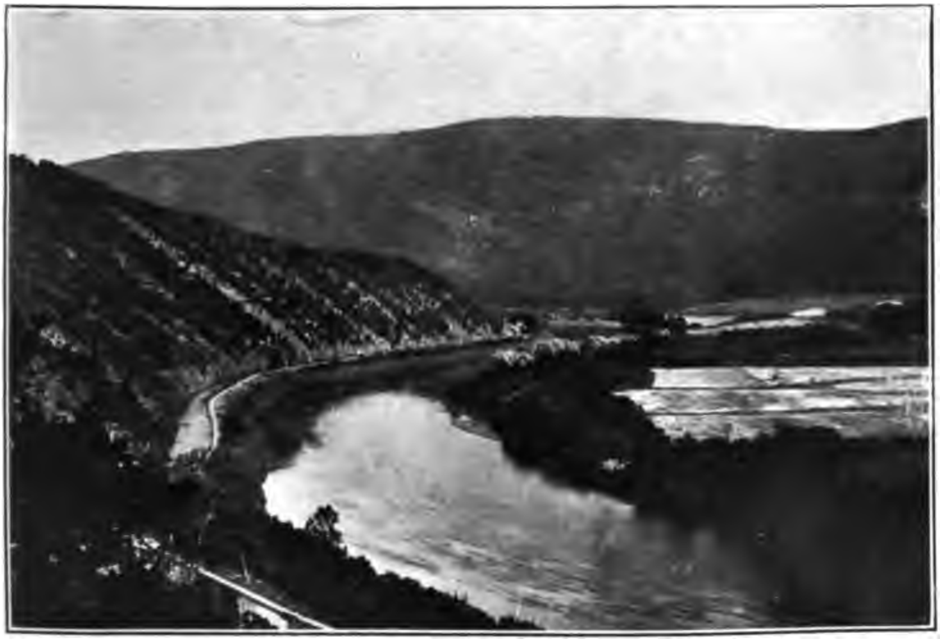

FIG. 1.—CHARACTERISTIC SCRUBBY FOREST GROWTH ALONG THE POTOMAC RIVER SLOPES WHERE FIRES ARE FREQUENT

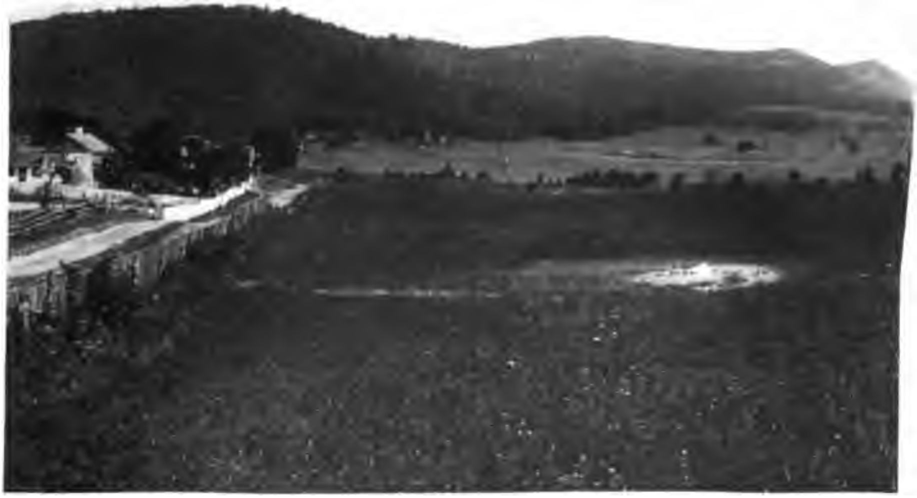

FIG. 2.—A TYPICAL MOUNTAIN FOREST

LOWER SLOPE TYPE.

The lower slopes of the mountains usually have a much deeper soil than the upper slopes and there is also a larger share of soil moisture which makes fires less destructive, as well as producing the best tree growth. The numerous trees of this type are the white oak, sugar maple, basswood, beech, red oak and ash. Hemlock and white pine are found only in a few places in the county, but when they do occur they are components of the Lower Slope Type. The timber of the lower slopes is the most important of all, because of its more rapid growth and better form. It is here that tall, straight trees with long, clear trunks, admirably adapted for saw timber, are found abundantly.

UPPER SLOPE TYPE.

The Upper Slope Type occupies the upper two-thirds of the mountain slopes, and contains the bulk of the forests of the county. The leading species of the type are chestnut, red oak, black oak, hickory and black birch. Scrub pine often occurs on the sterile soils of the southern slopes. Some of the trees of the Lower Slope Type are often found on the upper slopes where "benches" occur and where the soil is deeper and more moisture is present. The trees of the upper slope forests are, as a rule, shorter boled, of slower growth and less valuable for saw timber than those of the lower slopes. This type of forest furnishes a large per cent of the timber worked into cross ties and other small material.

RIDGE TYPE.

This type occupies the crests of the mountains and high hills where the soil is thin and rocky. The characteristic species is chestnut oak and occasionally pitch pine and table-mountain pine. The ridge forests are the most inaccessible, produce the poorest grade of material, and suffer the most from fires, hence they are of less importance than the other types. Railroad ties, mine ties, mine props and tan bark are the chief products of the forests of this type.

FOREST INDUSTRIES.

The timber resources of the county have, for many years, been one of its chief assets. The good local markets, the large percentage of valuable tree species in the forest, and the comparative ease of logging have encouraged the timber business and materially hastened the exhaustion of available supplies. The large extent of the forests has encouraged large operations. One of the large saw mills, so common in the past, is still in operation in the county, although its source of timber supply is nearly exhausted. In other places the old tram-road grades, still to be seen along the river and creek valleys, where the best of the timber was to be found, bear mute evidence of the great importance of the lumber business a few years ago. By means of these railroads the timber from the mountain sides and the valleys has been carried to the large saw mills for manufacture into lumber, lath, shingles and other materials.

LUMBER PRODUCTION.

The annual cut of lumber in the county is not nearly so large as it was ten years ago, but is still an industry of considerable proportions. Many of the mills that operated in large timber tracts a few years ago have cut over their holdings and moved away. The tendency is to use smaller mills of the portable kind that can be easily moved from one small tract to another, as the merchantable timber is cut. The exhaustion of the best timber supplies and the increased price of lumber has resulted in the cutting of smaller trees which, a few years ago, had little if any value. Consequently many of the timber tracts that were cut over years ago have been cut a second or even a third time. Often the second cut has sold for more than the first, although the timber was much smaller. The profits in lumbering are often greatly supplemented by the material, other than lumber, that is secured in the operation, as mine props, railroad ties, bark, etc. When such material is taken along with the saw timber the tract is cut almost clean. The cut of lumber, lath and shingles for 1909, as reported by 40 saw mills, was as follows:

LUMBER CUT OF 1909 WITH VALUE AT THE MILLS.

	Board Feet.	*Value.*
Hardwoods:		
Oak	6,659,000	$116,533
Chestnut	1,355,000	19,241
Maple	376,000	5,647
Gum	223,000	2,676
Hickory	174,000	5,847
Yellow Poplar	10,000	225
*All Others	378,000	6,784
Softwoods:		
Yellow Pine	3,874,000	48,812
White Pine	3,119,000	49,904
Hemlock	21,000	273
Spruce	1,000	18
Total	16,190,000	$255,960

Lumber.—The lumber output of 16,190,000 feet was made up of 9,175,000 feet of hardwoods with a value at the mills of $156,953, and 7,015,000 feet of softwoods valued at $99,007.

Lath.—The cut of lath was 1,028,000 principally from the edgings of pine and chestnut, and was valued at $3,700 at the mills.

Shingles.—75,000 were produced, valued at $356. These were principally white pine and chestnut.

The average price of hardwood lumber at the mills was $17.80 per thousand feet, and that of yellow pine $12.60 per thousand. The bulk of the lumber cut in the county was shipped out; probably not over one-third was retained for local consumption. 3,205,500 feet (board measure) of lumber was manufactured in the county in 1909 into furniture, wagons, doors, sash, flooring, ceiling, interior finish, boats, and other finished products. The cost of the material used at the factories was $91,984.

Railroad Ties.—It is estimated that 47,000 standard railroad ties were cut in the county in 1909, besides a very large number of mine ties. The railroad ties were mostly of white oak, while the mine ties were principally oak and chestnut. Where railroad ties alone are cut from trees there is a large percentage of waste, since for standard railroad ties the stems of the tree below 10 inches in diameter cannot be used. Where mine ties and mine props are cut from all parts of the trees not fit for standard railroad ties, the percentage of waste is greatly reduced.

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* Includes birch, beech, basswood, ash, elm, sycamore, cherry and walnut.

Mine Props.—Allegany County contains very extensive coal mines which require annually large quantities of mine props for their operation. It is estimated that over 1,000,000 cubic feet of mine props were cut in 1909. The length of prop varies with the thickness of vein, but the average length is about 8½ feet, with a minimum diameter at the top end of about 3½ inches. When the tops and laps of the trees cut for lumber or railroad ties are worked into mine props it is an economical use of material and conducive to cleaner methods of logging; but when the young, thrifty trees are cut for mine props, as is usually the case, especially of the valuable species, it is very detrimental in preventing a proper reproduction of the best species.

Cordwood.—Naturally, in a county where coal is so abundant, the cutting of cordwood is not much of an industry. The coal mines that are now worked are confined to the western part of the county, so that in the eastern section, away from the railroad, wood is used for fuel. It is estimated that in addition to the wood used on the farms, over 5,000 cords were cut and sold for use in the towns, or for shipment out of the county.

Tanbark.—Chestnut oak and hemlock bark are the principal kinds peeled, although black oak is also used to some extent. Practically all of the bark is a by-product of logging or tie cutting operations, but is, nevertheless, a considerable item of revenue from the forests. It is estimated that 5,000 tons of oak and hemlock bark were produced in Allegany County in 1909. Much of the bark from the county is shipped to the large tannery at Paw Paw, just across the river in West Virginia.

Poles.—4,000.

Pulpwood.—500 cords of pulpwood, mostly yellow poplar, were reported cut in the county in 1909. This is probably an under-estimate, but reliable figures are difficult to obtain.

Summary of the Lumber and Timber Cut.

		Value.
Lumber:		
Hardwoods	9,175,000 board feet	$156,953
Softwoods	7,015,000 board feet	99,007
Total	16,190,000 board feet	$255,960
Lath	1,028,000	3,700
Shingles	75,000	356
Railroad Ties	47,000	23,500
Mine Props	1,000,000 cubic feet	62,500
Cordwood	5,000 cords	17,500
Tanbark	5,000 tons	47,500
Pulpwood	500 cords	2,250
Poles	4,000	8,000
Total		$421,266

TRANSPORTATION FACILITIES AND THE CONDITIONS OF THE TIMBER MARKET.

The two principal railroads are the Baltimore and Ohio with its thirty-four miles of double track in the county, and the Western Maryland, with its fifty-two miles of single track. Both are trunk lines, skirting along the southern border of the county, parallel to the Potomac River. Three other railroads, the Cumberland and Pennsylvania, with fifty-one miles of track; the Cumberland and George's Creek, with fifteen miles; and the Pennsylvania with six miles, are engaged in the coal-carrying trade with the terminus of each at Cumberland, which serves as the outlet to the coal fields. The one hundred and six miles of railroads that traverse the county are confined to the western third and the southern border, giving to these sections excellent railroad facilities; but the larger portion of the county, which lies to the east of Cumberland and south of the Pennsylvania state line, has no railroad connection, except a logging railroad extending north from Oldtown for about ten miles. This railroad, however, carries only timber, bark, props, etc. The wagon roads following the valleys north and south are fairly good with moderate grades, but the few roads that cross the ridges are usually rough and steep, making transportation difficult.

DESTRUCTIVE AGENCIES.

The poor condition of the forests is due to several causes, chief of which are fires, wasteful methods of logging, and grazing.

The mountain counties of the State have suffered most from forest fires, and probably no county has been more severely injured from this cause than has Allegany. Most of the forest lands are on the thin, dry soils of the mountains, where there are large continuous bodies of woodland. In the dry seasons, which occur nearly every spring and autumn, the forest litter gets very dry, then extensive fires are the result. Some of these fires are started by railroad and logging engines, some by hunters, some by brush burners, some by saw mills, and others by various means. One thing is certain, and that is that most of them start through carelessness, making it a little less than criminal. During the past forty years it is probable that the damage to merchantable timber and to young growth from forest fires has exceeded the value of all timber cut from the forests for that period. Since the establishment of the State Board of Forestry statistics concerning forest fires have been collected annually, and a summary is given below:

FOREST FIRES.

Year.	*Number of Fires Reported.*	*Acres Burned.*	*Amount of Damage.*
1906	21	12,600	$25,200
1907	17	6,100	15,100
1908	14	14,307	42,921
1909	8	2,713	8,139
1910	6	470	1,410
1911	22	5,926	15,807

The forest fire records have been made up from the reports of Forest Wardens, supplemented by other sources of information, but it is very probable that not all of the fires were reported.

Most of these fires reported were started, as usual, by railroad and logging engines, saw mills and hunters. Of the total number reported in the six years, 49 were autumn fires and 39 were spring fires. Spring fires are the more destructive to young growth, as they occur during a

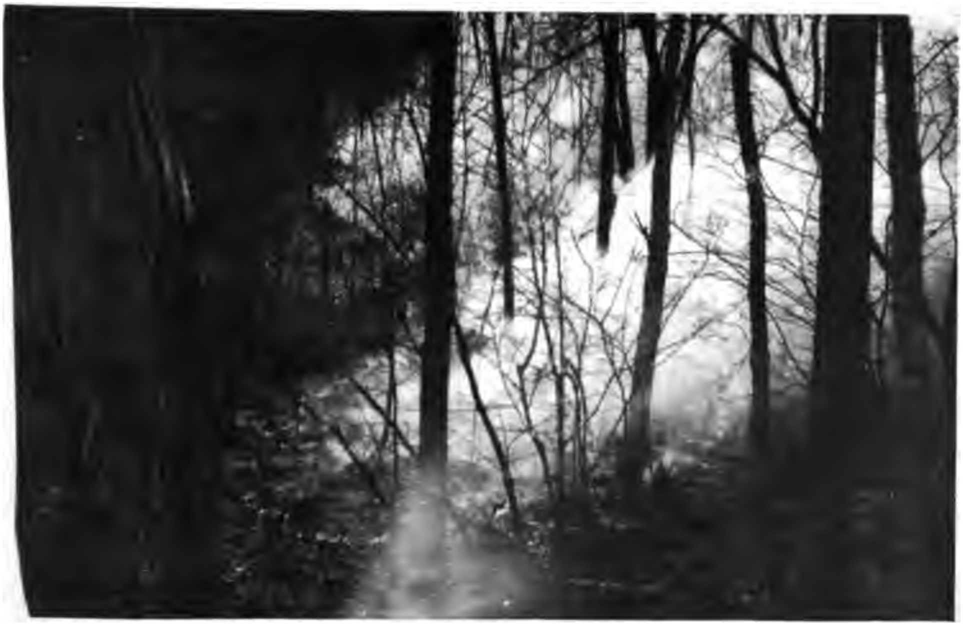

FIG. 1.—A FOREST FIRE IN PROGRESS, DESTROYING THE HUMUS AND THE YOUNG GROWTH, AND INJURING THE LARGER TREES

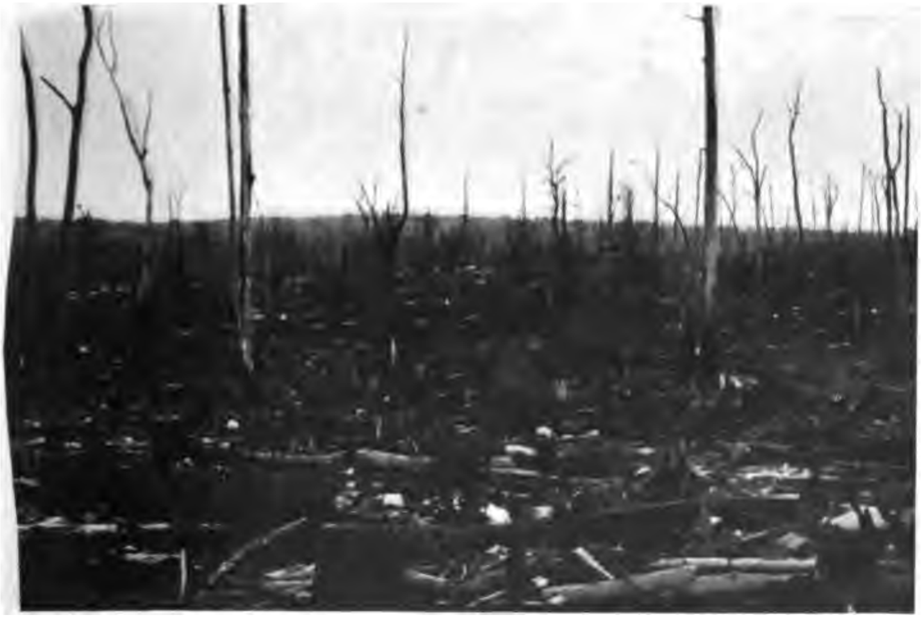

FIG. 2.—THE EFFECT OF DESTRUCTIVE METHODS OF LUMBERING FOLLOWED BY A FOREST FIRE

period when the sap in the trees is active, and a growth of tender tissue has begun to form just beneath the bark. The extra moisture in the sapwood found at this season becomes suddenly heated by surface fires, causing the wood cells to expand so rapidly as to burst open the bark. Where previous fires have ruptured the bark the wound is enlarged, often completely girdling the small trees causing death. Whenever the living wood of the tree is exposed by these fire scars, it offers entrance to the wood-decaying fungus diseases which rapidly work into the tree causing unsoundness and decay. The full amount of the damage is not apparent until the tree dies, or is cut, when it is found that a large portion is worthless. Surface fires kill the seedlings and seed which nature has provided for the perpetuation of the forest. This means non-producing blank spaces, or what is worse, openings where weeds and grass come in to prevent tree seedlings from getting re-established.

Another serious loss from forest fires is the destruction of the leaf litter and humus on the ground. This mulch checks evaporation from the soil, prevents it from becoming dry and hard, keeps the soil particles in a porous condition so that the water which falls on the surface is readily absorbed and carried to the lower layers from which it is given out gradually, but continuously, to maintain stream flow. Furthermore, trees that are injured by forest fires are much more susceptible to insect attacks than those not so injured. The healthy living tree has strong powers of resistance. When the bark has not been broken, or burned, it affords a strong protective covering. Once this bark is broken, or burned through, and the living wood exposed, the tree is laid open to the attacks of all manner of wood destroying diseases. It is a notable fact that insects begin their attacks in the less vigorous trees, such as have been injured by fire and other causes, because these have less vitality to resist such attacks. Having once become established in the weak trees, these insects, which breed incredibly fast, become so numerous that they can successfully attack the healthy vigorous trees, and in a way this vast damage is often done to entire forests.

ESTIMATING FIRE DAMAGE.

There has been so much difference of opinion as to the damage from forest fires that no two people will arrive at the same independent estimate. The elements that enter into the estimate are numerous, and different people give each a different relative value. Most people only consider a few of the elements, such as fencing, cordwood or the amount of wood actually burned; others, in addition to this, will include the merchantable standing timber destroyed, and a very conservative estimate for young growth burned up. In arriving at a correct estimate of forest fire damage there may be as many as four different elements to consider as follows:

I. Buildings, Fences, Cut Wood and Timber.

These all have a recognized value that can be easily determined.

II. Merchantable Standing Timber or Wood.

Evidence of those competent to judge standing timber and who know the particular tract should be conclusive.

III. Young Growth.

To arrive at a just estimate of the damage to the small growth that has been destroyed is most difficult. In general, the damage to young growth is equivalent to the cost of replacing it. This means that in case a young stand of hardwood ten years old is burned over, killing practically all of the trees, or seriously injuring them, it would take at least ten years' time to replace the growth. The loss, therefore, would be the cost of replacing a similar stand ten years old. If we assume that new growth will come up at once as sprouts from the burned tree roots, and will be of as great a density and of as good a quality as the stand that was burned, we may calculate the loss in this way. Interest should be charged on the value of the land for ten years, because it represents an investment. (Since the interest is accumulative, it should be compounded rather than simple interest.) To this should be added the taxes for the ten-year period. The method may be illustrated thus:

Assuming the land to be worth $10 per acre, the taxes 7c. per acre, per annum, and the rate of interest 6%. Then the interest for ten years, compounded, will be $630, and the taxes for ten years with interest compounded will be 97c., making a total of $7.27 per acre. Figured at simple interest, with no interest charged against taxes paid, the amount would be $6.70 per acre. Other land values and tax rates may be calculated in the same way. As a matter of fact, when a young hardwood growth is burned over, the sprout growth which follows is scarcely ever as good as the one burned off. Each succeeding fire reduces the sprouting capacity of the trees and makes the growth less vigorous. Each burning over allows a larger proportion of the light-seeded, less valuable trees, such as red maple and birch, to come in to usurp the ground.

IV. Soil Damage.

The accumulation and decay of the leaves that fall to the ground every year form a mulch which is the most efficient conserver of moisture known. It adds fertility, prevents a growth of grass and weeds, and keeps the underlying soil in the best physical condition. The ordinary surface fires destroy this mulch, or humus, and expose the soil to the drying effects of sun and wind. It soon becomes dry and hard, so that it is difficult, or impossible, for seeds that may fall in the open places to germinate. If the land is at all steep, erosion is likely to take place. The forest is likely to change in character from one in which the valuable species greatly predominate to one consisting principally of inferior growth. It takes many years, even generations, to repair the damage of a forest fire. While the money loss to forest soils from fires is difficult to estimate, it is nevertheless a real one, and should be considered. It is a case of calculating the loss in producing power from factors that are but little understood. It is not possible in this brief report to discuss them. It is sufficient to say that general observations bear out the statement that the average surface fires in the mountain sections reduce the producing capacity for the next five years at least one-fourth. The amount of the injury will vary with the character of the soil, the slope, and aspect. It will be more severe on shallow soils, and on southern and western exposures, and less on moist, deep soils, especially on northern slopes.

PREVENTIVE MEASURES.

The important thing to work for is the prevention of forest fires. To that end the first requirement is a good public sentiment against fires, and secondly, the enforcement of our forest fire laws, which are complete, and when fully enforced, will reduce the fire loss to a very small percentage of the present annual damage. Everybody interested in the protection of woodlands should fully co-operate with the local forest wardens in suppressing forest fires. The forest wardens for the county are:

H. S. Krumbine, Gilpin.
Thomas J. Krumbine, Cumberland.
Floyd Stotler, Dawson.
L. C. Twigg, Oldtown.
D. C. Llewellyn, Midland.
G. M. Mayer, Frostburg.
Stephen Llewellyn, Barton.
D. D. McElfish, Cumberland.

Any fire that cannot be controlled by the landowner, on whose land it starts, should be reported promptly to the nearest forest warden, who is authorized under the law to employ any means that may be necessary to extinguish it. There is a penalty of not less than $25, nor more than $1,000, or imprisonment for not less than 30 days, or more than one year, for carelessly, negligently or maliciously setting fire to another's woodlands. For allowing fire to escape to adjoining lands, a landowner is not only liable for the damage caused, but also liable for the cost of extinguishing the fire.

One of the best protective measures that a landowner can take is the construction of fire lanes. Fire lanes are cleared strips through the woods which serve as a check to an advancing forest fire. These may consist simply of woods' roads kept free of inflammable material, or they may be specially constructed at the most advantageous places, as up the side of a mountain, or along the crest. These lanes not only serve to check light ground fires, but in the case of fires driven by a heavy wind, the lane affords an excellent line from which to back fire. Furthermore, the fire lanes serve as roadways for removing timber and wood, and in case of fire they permit the fire fighters to reach the scene of the fire easily and quickly, instead of by tedious and slow travel through the brush.

Another means of reducing the fire damage is clean forest management. When trees are cut, the tops and laps should be utilized as closely as possible: dead and down timber should be removed, whenever it will pay for the cost. If it is not practicable to pile and burn the brush—often a dangerous expedient—it should be reduced to small pieces and scattered over the ground so that the first snows will cause it to settle and rot quickly on the ground.

In dealing with a forest fire the first essential is promptness. One man can often do in fifteen minutes at the beginning of a fire what one hundred men cannot do in an hour after the fire gets under headway. There must be a sufficient force, well organized, and properly directed, to prevent unnecessary loss. It is for this purpose that the Forest Warden Service has been organized. The best tools to use will depend upon the character of the soil and kind of growth. The axe, hoe, rake, wire-brooms or brush, and in loose soil the shovel, are good tools to use.

DESTRUCTIVE METHODS OF CUTTING.

Second only to the fire damage is that caused by destructive and wasteful methods of cutting, and in some cases it is even greater than the fire damage. The results of destructive methods of cutting are shown in the following ways:

1. The most valuable species are repeatedly taken, even to small diameters, and the inferior or cull material remains to occupy the ground to the exclusion of species that might be of much greater permanent value.

2. The frequent cutting of the forest for the larger trees has left open places in the woods, which are either unproductive, or if such areas have become seeded and made productive, it is often with species of little value.

3. Cutting the high stumps and leaving such a large amount of good material in the tops of the trees is wasteful, and, furthermore, this large amount of debris left in the woods after logging greatly intensifies the forest fires that nearly always follow lumbering operations.

4. Careless ways of felling trees, and other unnecessary destruction of the young growth in cutting extra roads, etc., is responsible for much of the permanent injury to the forest.

5. A better knowledge of the market's demands, and the different uses of woods will enable the owner, not only to utilize more closely the trees that are usually cut, but also make use of the so-called inferior woods which, if uncut, would prevent a more valuable new growth in their place.

Waste cannot be fully eliminated unless there is a good market for material of all sizes, the small as well as the large. In the western part of the county, where there is a good market for mine props, the small material can be fully utilized, and there is everywhere a good market for the larger material. Under such conditions intensive forest management is possible and should be adopted. The eastern section of the county, especially that part located some distance from the railroads, has no good market for the small material, and hence in logging operations there is a large percentage of waste. A considerable amount of this waste is unavoidable under present conditions; but, on the other hand, a large part of it is unnecessary and could be saved by adopting more economical methods. This is illustrated forcibly in the cutting of railroad cross-ties, which is an important product of the forests of the county. Under the methods now in use, it has been found that in cutting trees from 12 to 20 inches (stump diameter) for railroad ties, that at least 50% of the usable stem length of the tree is wasted. The parts of the tree now wasted could be converted into additional railroad, or mine ties and fully utilize the trees that are cut. The waste in cutting mine props, while not so great as it is in the case of railroad ties and lumber, is still a serious one that can be largely avoided by adopting better methods of utilization. A mine prop is marketable if it measures four inches at the small end, and practically all kinds of wood are acceptable for the purpose. This being the case, there is no good reason why the large trees that are cut for saw timber, ties, etc., should not be fully utilized. The fact is, however, that the props are largely cut from the small, straight, thrifty trees that should be saved for a more valuable future growth, and the tree tops and larger straight branches that could be worked into props are seldom used at all. There are a variety of uses for the different woods and the market for forest products is constantly improving. The woodland owner who has timber to sell should first inquire into the market conditions, and endeavor to dispose of the different kinds of material in a manner that will prevent waste, and leave the cut-over lands in good condition for a new crop.

INSECTS.

There have been no serious insect pests in the forests of the county so far as the writer has observed. There have been slight attacks of bark beetles and wood borers in some sections, but nowhere have particular species of trees, covering any considerable area, been killed by insects. Forest insects are, however, on the increase, and the only way to prevent serious attacks is to take all reasonable precautions. It is a well-known fact that insects gain entrance to the forest usually through certain trees of low vitality—those in which the power of resistance has been so reduced by fires, or other causes, as to make them easy marks. Insects, after once becoming established, may increase so rapidly as to be able to successfully attack the more vigorous trees and become a serious pest. The best preventive is the removal of trees as soon as they show any decline. In logging, the tree tops and laps should be utilized as closely as possible, for it is just such material that offers the best breeding places for insects. In other words, a system of clean forest management where suppressed and dying trees are promptly removed, and the down material is fully utilized, is the most effective.

FUNGUS DISEASES.

The shelf-like projection, or "punk," as it is commonly called, found on the trunks of either standing of fallen trees, are the fruiting bodies of a fungus living in the wood. The fungus is distributed by means of exceedingly small spores, corresponding to seeds cast off by the fruiting body. These spores float through the air by the millions, and whenever they fall on portions of the trunk, or branches, of a tree where conditions are favorable, they germinate and penetrate the wood causing decay. Some of them live only in dead wood, others attack the living wood. The damage caused by this latter class is a very considerable one, which should not be overlooked in the well-managed woodland. What has been said concerning preventive measures in regard to insects applies equally with fungus diseases. As long as trees are kept in a thrifty condition they are not apt to be attacked by insects or diseases. Therefore, to keep them so is one of the main problems in forest management. Keeping out fires is one of the greatest securities for general health, and this, supplemented by cutting and removing all dead wood or trees that are being killed out in the competition among the trees themselves, or those that are diseased in any way, is the best preventive measure against serious fungus diseases.

FOREST MANAGEMENT.

Forest management,* as here used, means the application of certain principles in the care of the forests that will insure their greatest permanent productiveness. These principles must necessarily be modified in their application to suit the different conditions that exist, and to conform to the objects of management.

In the first place, most of the forests have suffered so severely from forest fires and destructive methods of cutting that it will take some time to restore normal conditions; and, secondly, the present fire risk is so great that it is not always practicable to make a present outlay to increase future yields, when there is a probability that all may be lost in subsequent fires. On the other hand, the price of timber is advancing to the point where it will pay to make at least a small investment, for the purpose of increasing future yields, and this is especially true when the investment is for better fire protection.

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* The State Forester, Baltimore, Md., will examine the woodlands of any landowner in the State upon application (and without charge, except the travel expenses), for the purpose of advising him as to the methods of forest management most applicable in his individual case. Write for Leaflet No. 1, which explains this plan of co-operation.

The natural conditions for timber production are exceedingly good as shown by thrifty stands where fires have been kept out, and where there has been no reckless cutting practiced. The poor condition of the forests on the upper mountain slopes is not due entirely to the thin soils, for there are practically no soils in the county that will not support a good tree growth where fire is excluded. It is the repeated burning of the mountains in which the leaf litter and humus are destroyed, causing the soil to become exceedingly dry and sterile, that accounts, in a large measure, for the poor timber growth. In any plan of forest management, therefore, fire protection must be the first consideration. The manner of securing fire protection has been discussed under the subject of "Forest Fires" and need not be more than referred to here. Any plan of fire protection that is adopted should be in co-operation with other landowners in the vicinity, unless the tract to be considered is separated by cleared fields from other woodlands, in which case the problem of fire protection will be a simple one.

Having solved satisfactorily the question of fire protection, the next step will be to place the woodland in a condition of greatest productiveness, with the least expense. The methods to be employed will depend upon the present condition. A woodland is fully productive when the ground is occupied entirely, that is to the exclusion of any open places, by the best trees of the best species for which the soil is adapted. The proper density of the forest is, therefore, of prime importance, for not only will the greater volume of wood be produced when the crowns of the trees are close enough together to touch eath other on all sides, but this crowding will produce tall straight trees with long clear stems that make the most valuable timbers. After trees attain their principal height growth, they will require a little free space around their crowns to promote the greatest diameter growth. Starting then with a young thicket stand of any species, or with mixed species of trees, crowding is beneficial in that it forces the most likely ones into rapid height growth to keep them above their competitors, and the dense shade kills off the small lower branches that would otherwise make knotty timber. During the small pole stage (under 5 inches in diameter) the stand may be greatly improved by cutting out undesirable trees, such as the black gums, red maple, beech, etc., where they are overtopping or crowding the more valuable species, such as chestnut, oaks, hickory, etc. This is termed a "weeding" in a young stand, and is similar to the same operation in the garden or cornfield and for the same purpose. By working over the forest at frequent intervals, with the idea of always favoring the more promising trees, and removing the undesirable ones as soon as they begin to interfere with the trees selected for the permanent stand, it is possible to mould the forest into the form desired.

Instead of a fully stocked young forest, the problem may be one of restocking and regenerating a badly burned and culled forest. In this case the important thing is to encourage a reproduction of the species best suited to the locality. Seed trees are generally present to begin with, and by keeping out fires a young growth will, in most cases, spring up rapidly. As the young growth develops such of the inferior trees as were left in the former cutting operations should be either cut and utilized, if they are worth anything, or deadened by girdling, if they will not pay for the cost of cutting, so that they will cease to overtop and check the growth of the young saplings. By a gradual process of thinnings and improvement cuttings, the undesirable trees may be eliminated from the forest and a full stand of desirable trees secured for the final crop.

Another common problem of forest management is that of a forest in which there is a considerable amount of merchantable material that the owner desires to cut and turn into money, but, at the same time, he wants to get it out in such a way that the producing power of the forest shall not be destroyed, since he intends to hold the woodland for future timber crops. In most cases of this kind there is already on the ground a good young growth which, if properly protected, will insure a satisfactorily second crop. The main consideration should be to frame the cutting contract (if the timber is not to be cut by the landowner) in such a way that the young growth will be saved. The usual practice is to specify a minimum diameter limit, to be measured at a certain height from the ground. In cutting to a diameter limit the inferior species, such as gums, red maple and beech should be taken, as well as the more valuable species, since it is very desirable to prevent these inferior trees from gaining any advantage in the stand which is to succeed the one that is being cut. Unless special care is taken in felling the trees, cutting roads, and getting out the saw logs, a great deal of this young growth will be destroyed. Some damage is unavoidable, but unreasonable damage should be guarded against in framing the contract, even if the price secured for the timber is a little less in consequence. These are precautions such as any careful business man would take, and they will pay well in the end.

The extent to which conservative forest management may be applied in any case will depend upon a number of factors, chief of which are the danger of fire risk, and the market for the different kinds of forest products. If these conditions are favorable there is the opportunity to practice forestry very profitably. Even if there is a serious fire risk, and the present market conditions are not favorable, the fact remains that nearly all of this land will be held for timber production, and since that is the case why not make the lands as productive as possible? especially as so much can be done by way of improvement at little expense. The danger from fires will rapidly decrease, as people generally come to appreciate the damage they do, and as the State makes more liberal provisions for forest protection. The market for timber products is sure to improve and is even now very good in the western section of the county, so that timber growing is certain to become more remunerative. The landowners, who are taking care of their forest now, will be the ones who will have the timber to sell a few years later when much better prices will undoubtedly be secured.

THE FUTURE OF FORESTRY.

The present wooded area of the county is 163,832 acres, or 62% of the total area. Much of this land is unproductive because of the frequent fires that burn over it, and a large portion of the remainder, while productive, is not producing more than one-third of what it is capable of yielding under proper management. Taking all of the woodlands together the average annual growth per acre, per annum, is about 12 cubic feet, or a total of 2,000,000 cubic feet for the county. The annual cut of lumber and timber products amounts to over 3,000,000 cubic feet annually, or 50% more than the annual growth. This over-cutting is only possible by the existence of 127,611,000 board feet (about 12,000,000 cubic feet) of saw timber, representing the growth of past decades that is still uncut. The present cut, therefore, takes all of the annual growth, and in addition 1,000,000 cubic feet of the surplus (12,000,000 cubic feet) now in hand. At the present rate of cutting the supply will last but twelve years, if the rate of growth and the forest area remain the same. The problem is a serious one affecting a natural resource, second only to that of the coal deposits and probably of even greater permanent importance.

The present wooded area is being materially reduced by the extensive clearing of land in the eastern section of the county for fruit growing, and it is likely that the forests will be cleared from small areas in other sections for farm crops. Furthermore, the demand for timber to develop the local industries is increasing, while the supply of timber is decreasing. Radical changes are, therefore, necessary to meet these changed conditions, if the county is to maintain its standing in timber production. This must be brought about in one of two ways, or a combination of both, as is likely the case. Either the forests must be made much more productive by better protection and improved management, or there must be a greater economy in the use of the material. The woodlands are well adapted for timber growing, the natural conditions are favorable and the native tree species are of suitable kinds. The annual growth of the forests can be increased two-fold by excluding fires alone. Add to this the increase that comes from proper methods of management, including thinnings and improvement cuttings, and the forest would produce at least four times what they are producing now, and they would continue to improve. Greater economies in the use of material would make the present cut go much further than it does, and since a large part of the present waste is unnecessary, even under present conditions, it is all the more inexcusable.

The county, instead of being a heavy importer of lumber, mine props, and other materials, should be exporting large quantities of these products. The forest area is sufficient and of suitable character for a continued production of $1,000,000 worth of material, annually, instead of the $420,000 that is now being produced. This can only be accomplished by stopping fires, and the general adoption of forestry methods in handling the woodlands which will insure their greatest productiveness.

CONCLUSION.

Allegany County has the largest percentage of forest land of any county in the State, amounting to 163,832 acres, or 62% of the total area. Nearly all of this is natural forest land which must continue to be devoted to the production of timber.

The value of the forest products, not including fire wood and fencing material, is over $400,000 annually. If the forest area was fully protected from fires, and proper methods of forest management were adopted, the annual production of the forests would amount to $1,000,000 annually, and this production could be indefinitely maintained.

Forest fires cause an annual loss of about $20,000, counting only the merchantable timber that is destroyed. If to this be added the destruction of young growth and the damage to forest soils, the amount would be much larger.

The present destructive methods of cutting are responsible for a marked deterioration in the production of the forests. Under present conditions the average production of the entire forest area is not over 12 cubic feet per acre, per annum. Under conservative forest management and proper fire protection, the yield of the woodlands can be increased four-fold.

There is a good market for forest products in the western section of the county, to supply the coal mines with props, pit ties, and timber; the railroad companies with cross-ties; and the telephone and telegraph companies with poles. Prices for these various products are advancing and there is a certainty of good returns from forest lands that are properly protected and conservatively managed. These growing industries demand an abundant supply of forest material and the production of the woodlands must be maintained to supply their needs.